

USSR

INDUSTRY

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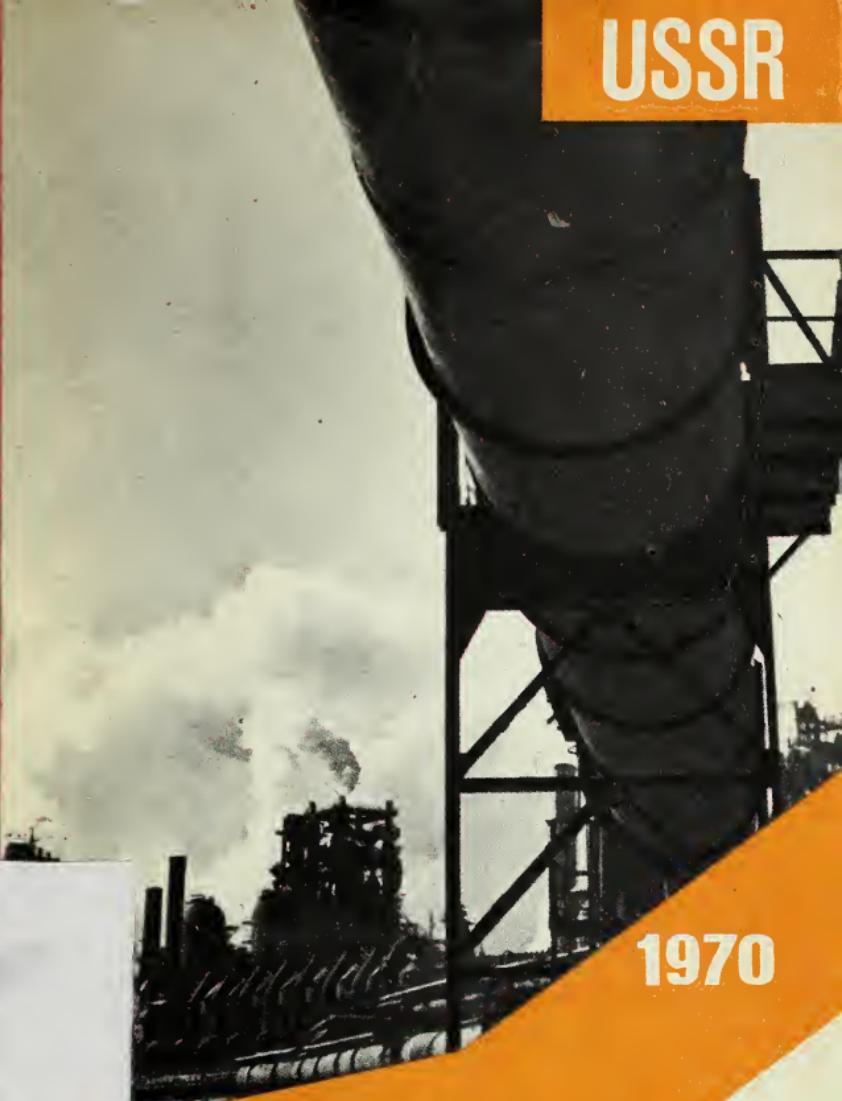
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No. 352

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1965

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*Industry. . . Is this a subject to interest the ordinary person who is not particularly concerned with the daily estimates of smelted steel or the number of new quarries and plants?*

*Don't dismiss the subject too quickly. Daily routine brings us into contact with industry much more frequently than one would imagine. In fact the contact is permanent.*

*Though we may pay more attention to the sports pages in the newspapers than the "serious" articles, the figures reflecting the quickly changing realities of the country are the ones we remember. This is only natural because today the most practical embodiment of man's age-old dream of a "time machine" capable of taking him into the future are the columns of figures known as the targets of the Economic Development Plan.*

*The Soviet Union was the first country in the world to formulate such a plan. Thanks precisely to planned socialist development, the USSR which occupies one-sixth of the world's surface was able in an extremely short period to become a great industrial power whose citizens were the first to emerge beyond the confines of the planet.*

*In 1959 the Soviet Union embarked on the now successfully completed Seven-Year Economic Plan.*

*It gave the people:*

THE  
THE VOLUNTEER

FOUNDATION OF PROGRESS

FIRE FILLED LADIES

THE YOUNGEST BUT  
THE STRONGEST

THE DAILY BUILDER



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- five and a half thousand new big industrial plants;
- new huge deposits of oil, gas, ore, chemical raw materials;
- practically doubled fixed assets of the country;
- a 50-per cent growth of the national income.

As a result of the fulfilment of the Seven-Year Plan the USSR, populated by seven per cent of the world's people, began to produce one-fifth of the world industrial output.

The 23rd Congress of the Communist Party approved the basic targets of the Economic Development Plan for 1966-70.

Within the next five years industrial output will increase by about 50 per cent, and on this basis real incomes will rise by approximately 30 per cent. Every section of the new economic programme, each of which is drafted on sound, scientific principles, has the same aim: higher living standards.

The Five-Year Plan — the new Soviet "time machine" — has got off to a good start. Though its targets—the figures for 1970 — speak of the future, this future is guaranteed by the reality of today. To see this reality it is sufficient to change

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from the "time machine" to any other type of modern transport.

## **THE WING, THE WHEEL, THE PROPELLER**

### ***The Record-Holders of Invisible Routes***

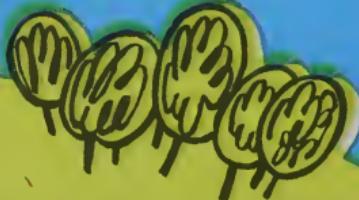
At Le Bourget in Paris in summer 1965 the star of the international air show was Antei, the world's biggest aeroplane, which carries 720 passengers. However, it is only one of the world-known representatives of Soviet aviation. There are the powerful, reliable air liners TU-104, TU-114, IL-18 which serve to link the Soviet Union with 38 countries.

The Soviet Union took the first place in the world for the total length of its airlines 25 years ago. At present the total length of domestic airlines across the huge country is almost half a million kilometres. The world's longest crosscontinental airline, linking Moscow and Petropavlovsk-on-Kamchatka, is 8,875 kilometres.

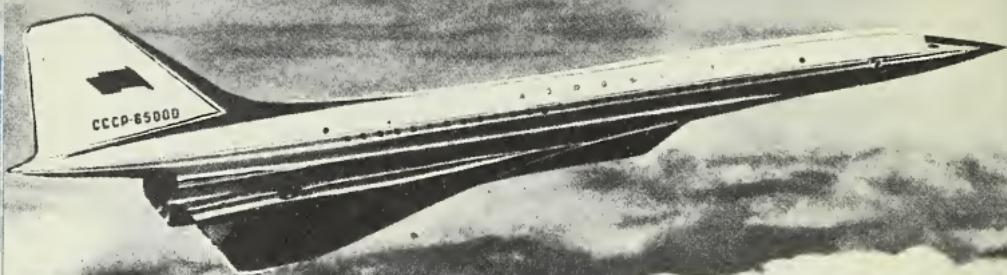
In the seven-year period all Soviet airliners have been completely overhauled. Aeroflot — the

By 1970 the airlines will  
carry 80 per cent more pas-  
sengers than in 1965.

**1970 · 180%**







Government Air Travel Company which has the monopoly of all aerial transport of passengers and freight in the USSR — possesses the most modern high speed turbojets and turboprops, many of which, despite their size, do not require concrete take-off and landing strips.

New helicopters, all distinguished by their high standards of reliability, extensive range and economy, have appeared in recent years.

In the coming five-year period (1966-70) the Soviet air fleet will be very busy. By 1970 passenger transport on all routes will increase by approximately 80 per cent and there will be a greater use of helicopters for short distances.

New giant passenger liners in the supersonic class like the *IL-62* and *TU-144* will follow the *Antei* and be put into service. Two hundred and forty modern airports will be built to serve international and local lines.

Soviet civil aviation is making wide use of semi-automatic systems by which big aircraft can land safely when visibility is poor. The installation of fully automatic landing systems doing away with all weather-imposed limitations commenced in the first year of the Five-Year Plan at many Soviet airports.

The Soviet people are proud of their air fleet. There are no vacancies in any of the aeroclubs (membership is free) and their number is growing

rapidly. New types of prop and jet sport aircraft are becoming available.

Aviation has become part and parcel of daily life to such an extent that chairmen of collective farms call for aircraft as readily as one calls for a taxi. There are people in the northern and mountainous parts of the country who have never travelled by car but who board an airplane or a helicopter as a matter of course.

Air and rail tickets cost about the same. Schoolchildren, tourists, soldiers, and students enjoy concession rates. By the end of the Five-Year Plan prices will be further reduced thanks to the economy of the new aircraft. The motto of Soviet pilots "to fly higher, farther and quicker than anyone else" can be supplemented with "to fly always, everywhere and for everybody."

## **Fly by Train!**

To suggest flying by train may seem strange, when we have aviation. And yet ...

Today, small piston-engined training aircraft develop a speed of approximately 200 kilometres per hour. The Moscow—Leningrad express trains travel at the same speed.

Approximately 40,000 kilometres of railroad had been electrified by the end of the Seven-

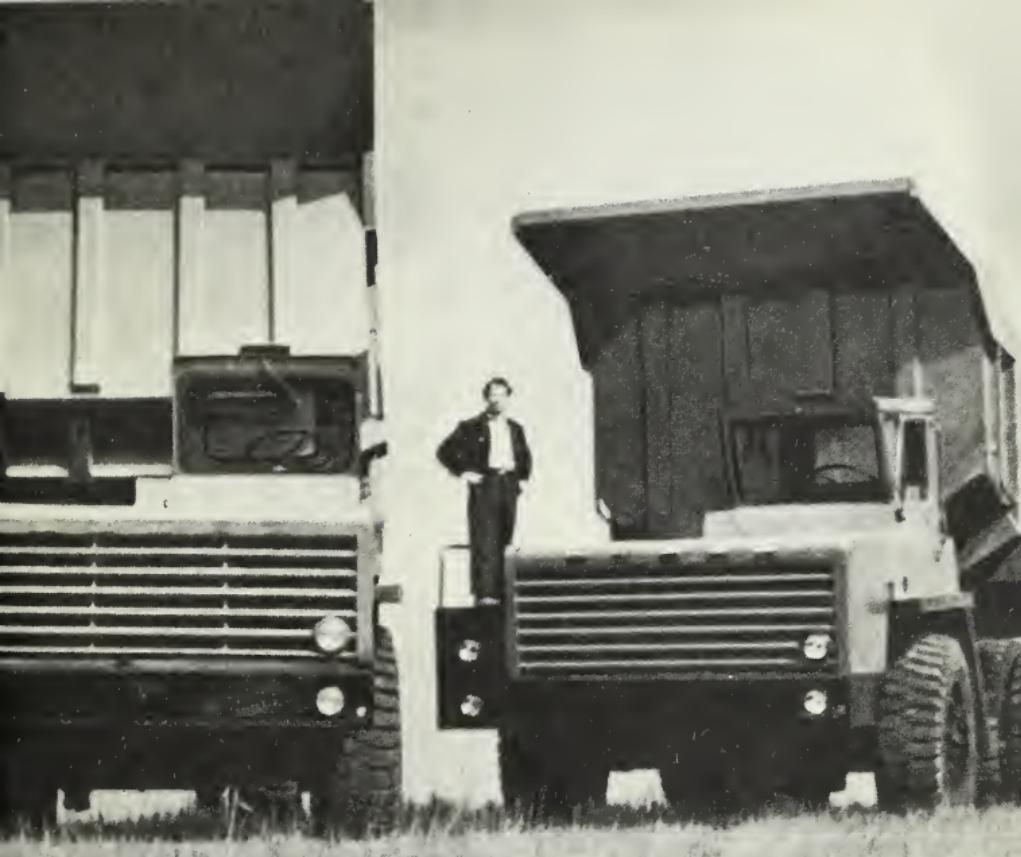
Year Plan (1959-65) and steam locomotives had been replaced by diesel trains on most of the routes.

By 1965 more than 85 per cent of all rail freight was carried by electric and diesel trains. Super-long electrified lines like the 5,000-kilometre East-West Moscow—Irkutsk line and the North-South Leningrad—Leninakan (3,500 kilometres long) have worked very efficiently.

Under the new Five-Year Plan (1966-70) the length of national railroads will grow approximately by 7,000 kilometres. Many lines are being built in the undeveloped, remote areas in Siberia, the Soviet Far East and on Sakhalin. Another 10,000 kilometres of electrified lines will be built and by 1970 the conversion of railroads from steam to electric and diesel traction shall in the main be completed.

New railroad technology in combination with automation which is increasingly taking over the control of rail transport operations has opened up new horizons. No longer does smoke hang over the rail terminals; superheavy trains can start without unpleasant jerks. On many lines there is little noise and heavy welded rails make for perfect smoothness. What is more, the first passenger train driven not by an engineer but by a computer has completed its trial run.





In 1958 the Soviet Union manufactured 511,100 motor vehicles. The figure reached 616,400 by the end of 1965 and is expected to more than double over the next five years.

**616,4**

**1965**





**1970**



## **20th CENTURY MODEL AUROCHS**

The Soviet lorry carrying a silvery aurochs on the bonnet, the legendary inhabitant of the Byelorussian Reservation, enjoys a fine service record in many countries.

There is a good reason why this symbol of strength and speed was chosen for the Byelorussian lorries. For many years this modern enterprise has been manufacturing mighty lorries with a carrying capacity ranging from six to several score tons.

These heavy duty lorries belong to a big family of Soviet motor vehicles. During the Five-Year Plan (1966-70) the production of various lorries will grow to 600,000—650,000 annually. This will include lorry trains with a carrying capacity from 110 to 220 tons.

The car pool for citizens personal use will be enlarged. Comfortable municipal, intertown and tourist coaches will appear and in 1970 they will carry almost twice as many passengers as in the last year of the Seven-Year-Plan period. Rising living standards for the Soviet people have brought about an increased demand for passenger cars. Existing plants are being re-tooled, new ones are being built. As a result of these measures the output of automobiles will grow fourfold to reach an annual figure of 700,000—800,000 by 1970.

It should be added that the Five-Year Plan calls for the building of 63,000 kilometres of highways in the USSR — the land of huge distances. These in turn will create additional possibilities for the efficient use of the motor pool. All these measures taken together will make possible a 70 per cent increase of motor transport freight turnover.

## **On the Waves and Above the Waves**

Ships flying the Soviet flag may be met on the high seas all over the world. The Soviet Merchant Navy, supplemented by modern vessels built in the USSR, Poland, the GDR, Yugoslavia, Finland, Denmark, Italy and Japan has advanced from the 11th to the 6th place in the world in tonnage.

Tonnage increased by 150 per cent in the Seven-Year Plan. Because of its highly efficient operation it has become as profitable as the national gold-mining industry.

According to the Five-Year Plan merchant navy tonnage will be increased by about 50 per cent.

New high-speed vessels with great freight capacity will commence operations, while graceful diesel ships will provide all conceivable comfort for their passengers. For example:

The ocean-going *Parizhskaya Kommuna* sailed on its maiden voyage in the opening year of the new

Whereas in 1958 the Soviet Union manufactured 138,000 metal-cutting lathes, their production rose to 185,000 in 1965.

By the end of the five years the per annum output of metal-cutting lathes will reach 220—230 thousand.



**1970:**

**220-230**

THOUSAND



Five-Year Plan. This Soviet-built dry cargo boat is the first in the world to have a gas-turbine power installation of 13,000 hp.

This installation offers striking advantages. The engine operates practically noiselessly, people can converse in the engine room without raising their voices, there is no vibration on deck. Because the engine weighs less than the steam turbine installation, the commercial load carried by the boat is considerably greater. The *Parizhskaya Kommuna* can cover 12,000 miles without docking.

The list of novelties can be continued. Following its trial run in the Atlantic, a huge catamaran fishing trawler sailed on its first commercial expedition. The *Ker Ogly* crane boat, also built on the catamaran principle, has been launched and is installing oil derricks in the Caspian Sea.

The capacity of shipyards will grow in the five years, many technological processes of shipyards will be mechanized and automated.

The merchant navy plies the rivers as well as the seas. Comfortable hydrofoils and hovercraft sail the blue arteries of the country at a speed inconceivable in the past. It is not surprising that passengers who had neglected the river diesel boats because of their slowness are again crowding river ports. Many countries have bought such hydrofoil models as the *Kometa*, *Raketa* and *Meteor*.

The Five-Year Plan envisages a considerable growth in the river fleet freight turnover.

The river fleet is coping well with its new tasks. New powerful and economical craft like the 140 m long diesel-electric ships which drop anchor at the new of the reconstructed ports are a match for some of the sea going giants and are capable of carrying 10,000 tons of cargo.

Hence, the wing, the wheel and the propeller. The results of the Seven-Year Plan and the beginning of the Five-Year Plan show that these great conquerors of space are operating successfully for the benefit of the Soviet people.

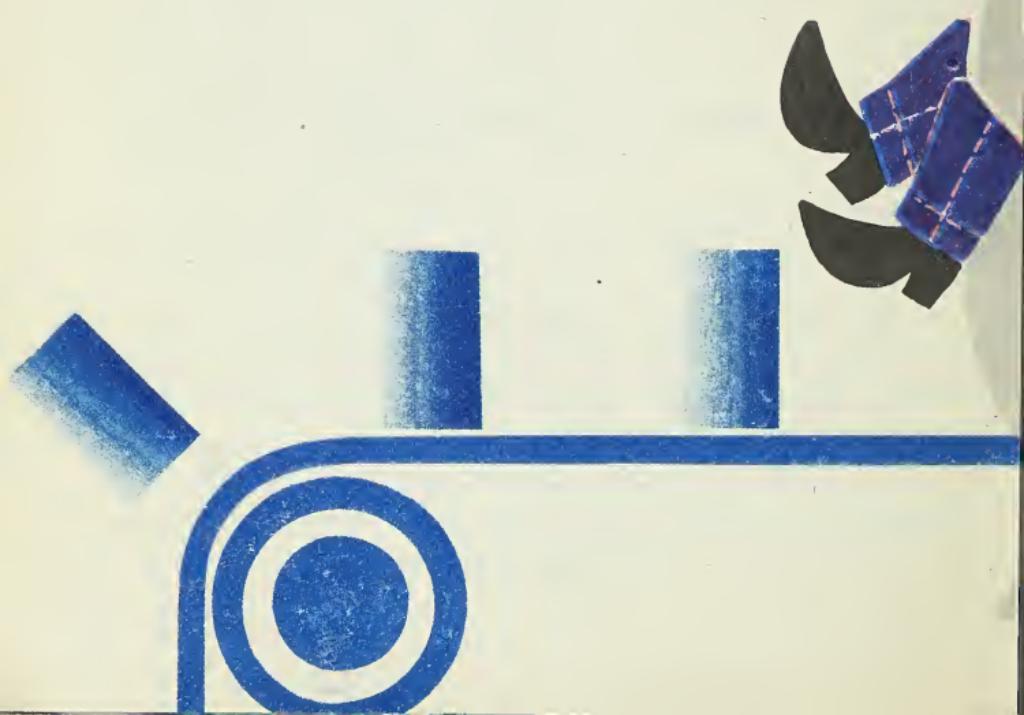
## **FOUNDATION OF PROGRESS**

### **Problem No. 1**

It is common knowledge that problem No. 1 for a young state is industrialization. On it rest all hopes of progress and prosperity. The backbone of industrialization is the engineering industry.

It is only natural that Soviet engineering developing on a scientific foundation has been making vast strides in every Five-Year Plan.

2,078 million roubles worth of instruments and automatic devices was produced in 1965. The number of listed products will be increased and their quality improved during the five-year period. In monetary evaluation their annual production will reach 3,570-3,670 million roubles by 1970.



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MILLION ROUBLES

**1970**

By the beginning of the Seven-Year Plan the country was manufacturing more than 1,600 modern machines, equipment and mechanisms. From 1959 to 1965 the output of the engineering and metal-working industries went up by 140 per cent. It is planned to increase it further by 60—70 per cent in the coming period, 1966-70.

Success in industrialization, the growth of engineering in particular has enabled the Soviet people not only to bring their country to the forefront, but has created particularly beneficial grounds for improving living standards.

While formerly the bulk of investment went into the industry manufacturing the means of production, there will be a levelling out of expenditures in 1966-70 and practically half of the funds will be invested in the consumer goods industries.

### ***Ingenuity, Precision, Efficiency***

Many machines and machine tools with the "Made in the USSR" trade mark are gaining increasing recognition on the world market. Some have won high awards at international displays and fairs.

Though the existing models meet practically every demand, Soviet designers are developing new models, new in principle and in operating on

the basis of the most promising metal machining methods.

In recent years Soviet industry has introduced and continues to perfect precision casting, precision die-stamping, automatic continuous rolling. Large scale production of first-class automatic machine tools forming a continuous production line, has been mastered to meet the home demand and export needs. Metal working machine tools founded on the electro-physical, electro-chemical and the ultrasound methods of operation as well as machines with the thinnest possible electronic beam cutter have been developed and are operating successfully. Nobody is surprised any longer to see machine tools for the processing of parts made of superhard materials with a synthetic diamond cutter.

New vistas are opened up not by new ideas alone, but also by a new application of a well-known method. Thus, in the beginning of the current Five-Year Plan, metal pressing experts developed a method of producing tooth gears — parts wanted everywhere: in automobiles and tractors, in machines and diesel trains.

The new method is based on forming the gears by pressing. The production of pressed gears is scores of times more efficient than the old method. Less metal is wasted and the gears are more durable. New technology saves the country millions of roubles.

Such modern machines, for working metal by highly efficient methods, just as the machine tools of high and super-high precision as well as programmed machines will be manufactured in increasing numbers under the Five-Year Plan. Combined with modernized methods of control and measuring they will not only change the appearance of factory shops, not only improve labour conditions for hundreds and thousands of workers but will bring about a big rise in productivity.

## **Giants Among Giants**

Soviet heavy engineering plants are often referred to as the factory-making factories. Sure enough, the blooming mills, the rolling mills, the walking excavators made at these enterprises are huge and complex:

The Soviet Union has built the world's biggest blast furnaces, blooming mills at the Krivoi Rog and Chelyabinsk plants with a productivity considerably higher than that of similar installations in other countries. One of the Siberian plants has an all-purpose pouring machine which is eight metres long and weighs 500 tons. It pours metal and slag automatically, doing away with arduous physical labour completely.

The engineering industry has put out the world's most powerful turbines and generators for the hydro-power stations in Bratsk and Krasnoyarsk during the recent Seven-Year Plan. Work is in progress for increasing the unit capacity of power generating equipment and following the power-blocks (turbine and generator) of 300,000 and 500,000 kw, new power blocks of 800,000 kw and even more than that are being developed.

During the Five-Year Plan new gigantic mills will be erected for the iron and steel industry, modern chemical works for the production of ammonia, superphosphate, polyethylene, installations for highly automated oil-processing plants each with a production capacity of 6 million tons a year.

Formerly unseen giants have appeared in mines and quarries. Walking excavators, each capable of doing the work of more than 10,000 navvies, and a rotary excavator as tall as a 20-storey building created at the Novo-Kramatorsk Plant and capable of stripping a layer of rock 70-metre wide as it travels the length of the quarry.

But this will do for estimates and comparisons. Indeed, the power of industrial giants and their possibilities are infinite.





## **Allies Today, but Tomorrow...?**

Complex modern technology demands the extension of the powers of man's senses with the aid of instruments. The eyes of the ultra-sound flaw detector can detect a microscopic cavity in a blank, a profilograph will feel an unevenness on what seems to be a mirror-smooth surface, a spectrograph will give a detailed description of the content of boiling metal.

Therefore, the integration of all relevant data, their analysis, the choice of the best solution has been entrusted today, in many respects, to machines.

Everybody is well aware of sci-fic stories about robots and computers turning from servants and allies into enemies and masters of man. It is highly doubtful, that anyone in our country considers this possibility seriously. Soviet people place electronic machinery at the service of the economy which is developing within the scientific framework of the Five-Year Plan and regard electronic machines as friends and allies, both today and tomorrow.

Under the Seven-Year Plan of 1959-65 the production of all types of instruments (including mathematical machines) was to increase by 150 per cent. This target was exceeded. By the end of the Five-Year Plan, i. e. by 1970, the output of instruments



and means of automation will grow approximately by 80 per cent. The plan provides not only for the quantitative growth of all types of products of the instrument-making industry but also for its advancement to a new level of quality. Powerful, high speed computers are being developed.

The use of this technology in the planning and management of the economy has opened up vast prospects. This concerns not higher productivity or economic advantages alone; the introduction of "clever" machines into industry is gradually changing the very nature of labour. This directly concerns every person because it brings problems that did not exist formerly.

Automation reduces arduous manual labour, makes work more pleasant, more intellectual. However, does it hold a threat of unemployment?

Yes, it does, wherever the worker is not the master of production and gets the sack on the introduction of automation.

No, it does not, when the introduction of automatic machines is followed by sending workers to free retraining courses to improve their qualifications. After completing such courses, some go back to their shops to supervise the new automatons, others are given jobs at the same pay at new enterprises (for that was the purpose of retraining).

The Five-Year Plan provides for a vast pro-

gramme of retraining specialists and workers. Unemployment does not exist. Despite the introduction of automatons and electronic computers, despite the reduction of staff at every enterprise, the overall labour force in the country is far from growing smaller. On the contrary, it increases. The guarantee of this is the successfully fulfilled programme of construction of new enterprises and extension of old ones.

Technological progress in socialist industry "threatens" people with nothing but easier and more interesting work, with a shorter working day and working week, higher productivity and a bigger wage packet. While some philosophers try to paint the "invasion" of machines as the disaster of the century, it in fact brings real prosperity — in keeping with the laws, according to which industrialization promised welfare to Soviet people and has lived up to the promise.

## **FIRE FILLED LADIES**

## **20 Century — the Century of Metals**

Our age has a variety of adjectives — atomic, cosmic, cybernetic. And yet, above all, it remains the age of metals.

# 1970



In 1958 the USSR smelted 54.9 million tons of steel. Steel output in 1965 reached the 91 million mark. The per annum target for the end of the five-year period is 124—129 million tons.

# 124-129

MILLION TONS



With the appearance of the first polymer materials, some hotheads hastened to prophesy the dwindling of metal consumption and the advent of the age of synthetic materials. One can hardly claim that sabres of Damask or Ural steel inaugurated the Steel Age. Similarly, the Age of Synthetics is still to come. Metal consumption continues to grow. Metallurgy remains the backbone of industry. In keeping with this fact, Soviet plans of economic development provide for everything necessary for the development of metallurgy.

Forty per cent of world iron ore deposits are in the USSR. Unique deposits of rare and non-ferrous metals have been found. Add to this the abundance of natural gas and cheap power, and it will be perfectly clear that natural resources place no limitations on the extension of Soviet metallurgy.

The Soviet Union also possesses the necessary technical means and experienced craftsmen for the „fireshop.” Soviet metallurgists hold many world records: they were the first to introduce high speed heats of metal, they make the utmost use of the furnace floor area, they were the first in the long-term operation of furnaces without overhaul.

Specialists from different countries have commented favourably on the merits of Soviet iron and steel mills. The mills built by Soviet specialists in other countries (for instance, the Bhilai Works in

India) help other people build up their national industries.

Statisticians say that the Soviet Union ranks the first in Europe and the second in the world for the development of metallurgy. Considering the rate at which output is growing it may be stated that the USSR is about to overtake the United States and has come close to it as regards such an important indicator as steel smelting.

## **The Earth's Reliable Axis**

It has been estimated that if the annual Soviet pig iron output was turned into a metre-thick column it would make a perfect axis for the globe, and would protrude 1,000 kilometres into outer space from each pole.

Jokes aside, it may be said that at the beginning of the recent Seven-Year Plan (1959-65) Soviet ferrous metallurgy was an impressive force indeed. In the seven years, pig iron output went up from 39.6 million tons to 66.2 million tons. Steel smelting mounted from 54.9 million tons to 91 million tons. Rolled stock output increased accordingly from 42.9 million tons to 70.9 million tons.

The picture will be even more impressive by the end of the current Five-Year Plan (1966-70). Pig





iron output will reach 94—97 million tons. That of steel — 124—129 million tons; rolled stock — 95—99 million tons. The output of steel pipes will more than treble.

What changes will the Five-Year Plan introduce in our ferrous metallurgy?

The plan doesn't provide for large-scale construction of new iron and steel mills, not counting the preparation for the development of the fourth far-eastern metal producing centre. However, a large number of existing enterprises will be enlarged and reconstructed making for additional output of considerable volumes of low cost metal within a brief period.

The third metal producing centre in West Siberia and Kazakhstan will be completed during the Five-Year Plan period. Also the Karaganda Iron and Steel Mill and the first section of the West Siberia Iron and Steel Mill will be built. New metal producing facilities will be developed in the centre of the European part of the country.

The output of high purity metals and of alloys with predetermined physical properties, as well as of high-precision shaped rolled goods, wide-flange beams, bimetals, pipes with glass-enamelled, plastic and anti-corrosive coatings will be expanded considerably under the Five-Year Plan.

All these new articles call for new materials.

Modern industry is in need of much better pig iron and steel. Soviet metallurgists are solving this problem successfully. They are continually developing new compositions. For instance, methods have been worked out for the smelting of structural steels with a strength reaching 300 kg per square millimetre — which is 50 per cent stronger than the ordinary steel.

Every year the country is producing bigger volumes of highgrade alloys with such properties as corrosion-resistance, refractory alloys and alloys with a small specific gravity. Ferrous metallurgy which was once believed to be a crude type of industry is beginning to resemble its refined sister — the metallurgy of rare and non-ferrous metals.

## **Immortal Gamut of Metals**

This seems to be an appropriate simile in relation to non-ferrous metals, some of which last indefinitely due to excellent anti-corrosive properties. Tiny quantities of these metals added to cast iron or steel impart special qualities. And so the non-ferrous metals are exceedingly important in aviation, atomic industry, electronics and radio engineering.

Germanium and silicon which are essential for the semi-conductors are the backbone of the in-

In 1958, the year before the Seven-Year Plan was launched, the Soviet Union produced 4.6 million tons of steel pipes. By 1965 this figure grew to 9 million. During the current five-year period the assortment of steel pipes will be expanded and their annual production increased by another 5-6 million tons.

14-15

MILLION TONS

1970





dustry which produces high speed computers, automatons controlling production processes, scientific instruments for artificial satellites.

Molybdenum, one of the youngest metals of the 20th century, is widely used in Soviet industry. It renders steel either hard or resilient, capable of withstanding great loads and high temperatures. Precisely this type of steel is wanted today for a variety of instruments and engines.

Twenty major enterprises of non-ferrous metallurgy were built or reconstructed in the country during the recent seven-year period. The capacity of the world's biggest centre of copper industry in Jezkazgan was trebled and in a few years the capacity of this gigantic industrial complex will be increased.

The new Five-Year Plan provides for priority development of the production of non-ferrous and rare metals. There will be a considerable enlargement in the output of aluminium, copper, zink, lead, magnesium, tin, nickel, titanium, tungsten, molybdenum and titanium concentrates as well as precious metals. As a matter of fact, parallel to the increased output of particularly hard metals there will be an increase in the output of diamonds.

All this goes not only for rockets and industrial electronics. The Five-Year Plan provides for the enterprises of the non-ferrous metallurgy to treble their output for consumer needs.

In recent years the centre of Soviet non-ferrous metallurgy has been shifted to the eastern parts of the country. This is explained primarily by the siting of the natural resources. The richest deposits of non-ferrous metals have been discovered in the East.

The second reason for the eastward shift of the non-ferrous metallurgy is its great power requirements. One should remember that it is in the East of Siberia that we have built a series of hydro-power stations, the biggest in the world, which generate power at a cost of 0.5 kopecks per kilowatt hour. Accordingly, an aluminium plant is being built in Irkutsk and another aluminium plant and a plant for aluminium rolled stock are being built in Krasnoyarsk.

In our age when industry has utilized many of the elements in Mendeleev's Periodic Table and has a special need for the non-ferrous and rare metals, the shifting of Soviet non-ferrous industry to the East is a harbinger of a gigantic shift in the industrial potential. Siberia, a land of fabulous deposits of minerals and of the cheapest power, is a truly promised land for the development of new powerful economic zones.

Well, we may agree that the 20th century is the age of metals but the age of synthetics has heralded its arrival.

# **THE YOUNGEST BUT THE STRONGEST**

## **Breath-Taking Reality**

Are you aware that ordinary air may be turned at least into a dozen useful things?

And that a minimum of 100 things may be made of water?

This is the reality that is truly breath-taking. Mankind made these discoveries only recently — some three or four decades ago — but has already succeeded in taking advantage of them.

At present there is not a single branch of world economy which is not making use of chemical industry products. Chemical industry creates materials with pre-determined properties easier than any other industry. Many of the new materials surpass the natural ones. Besides, they are manufactured at a minimum expenditure of labour and money.

The USSR, thus far, holds second place in the world for the output of chemical products. The Seven-Year Plan of 1959-65 provided for a threefold increase in the output of chemical goods. The same policy is maintained in the current Five-Year Plan.

The entire output of the chemical industry will double during the Five-Year Plan while the output of mineral fertilizers, synthetic rubber, chemical fibres, plastic and synthetic resins will be stepped up.

## **Something From Nothing**

To promise something from nothing would be risky even if the "something" were to be made from air. Chemistry, however, has literally overthrown the traditional concepts of industrial raw materials.

Natural gas and oil have become the basic raw material for the chemical industry. Thanks to new technologies, people not only obtain a variety of products but preserve many valuable staple goods, in many cases farm products — which formerly had served as the main raw material. Imagine a plant producing 120,000 tons of ethyl alcohol annually. If it were made from grain the plant would consume every year as much bread as a town with a population of three million.

New synthetic rubber, plastics, synthetic resins, artificial fibre plants are mushrooming today in the oil and gas bearing parts of Bashkiria, the Ukraine, the Volga areas and in Siberia — all areas well supplied with cheap electric power.

Caprolactam, lavsan and polyethelene, nitron and polystyrene are manufactured at scores of chemical enterprises. Industry can no longer do without polymeric materials which replace acid resistant steels and non-ferrous metals, traditional insulation materials and corrosion-proof coatings. Today, Soviet engineers and workers are turning plastics —

which but recently had symbolized fragility — into parts for bodies of heavy duty lorries, mine trolleys and parts for aircraft.

Another interesting point. With its advent, that is from the days when our grandfathers and fathers tried out the first celluloid shirt collars and cuffs, chemistry linked itself forever with the production of consumer goods. In our times synthetic fibre and fabrics, detergents and plastics are made first of all for the needs of people and their households.

With the overall doubling of chemical output, the production of chemical consumer goods is to grow by 150—200 per cent in the current five-year period.

## **Where Do the Chips Go?**

„When you chop down a tree you don't worry about the chips,” says an old Russian proverb. Sure enough, in old Russia nobody paid any attention to the chips in the timber industry.

History has ruled differently in this respect. Today the chemical industry uses timber, like any other raw materials, in the most economical way and every bit of “waste” is utilized.

The wood chemical industry is a perfect example, a perfect model of grouping and combining diverse chemical productions.

The fact that the Soviet Union is fabulously rich in timber is common knowledge. Timber is our country's traditional export. Exports of timber are expected to grow. Concurrently, home consumption of timber is increasing though the nature of consumption has undergone considerable changes.

Dmitri Mendeleev, the great Russian chemist and author of the Periodic Table of elements, made the following remark: "Oil is not a fuel. One doesn't burn banknotes." This maxim, with the progress of the chemical industry, has become particularly true when applied to timber.

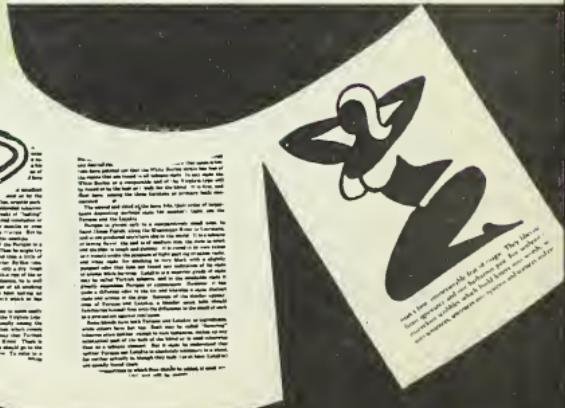
Timber is, above all, an excellent chemical raw material.

Here are some quotes from the Five-Year Plan: "The first section of the Bratsk Timber Industry Complex will be completed and the second section begun..." "Work will be started on the Osinovsk, Yeniseisk and Chuna timber industry complexes..." "The organization of the timber industry complexes at Verkhne-Kondinsk and Tavda will be begun."

What is a timber industry complex?

It is not merely an enterprise but a qualitatively new phenomenon in industry.

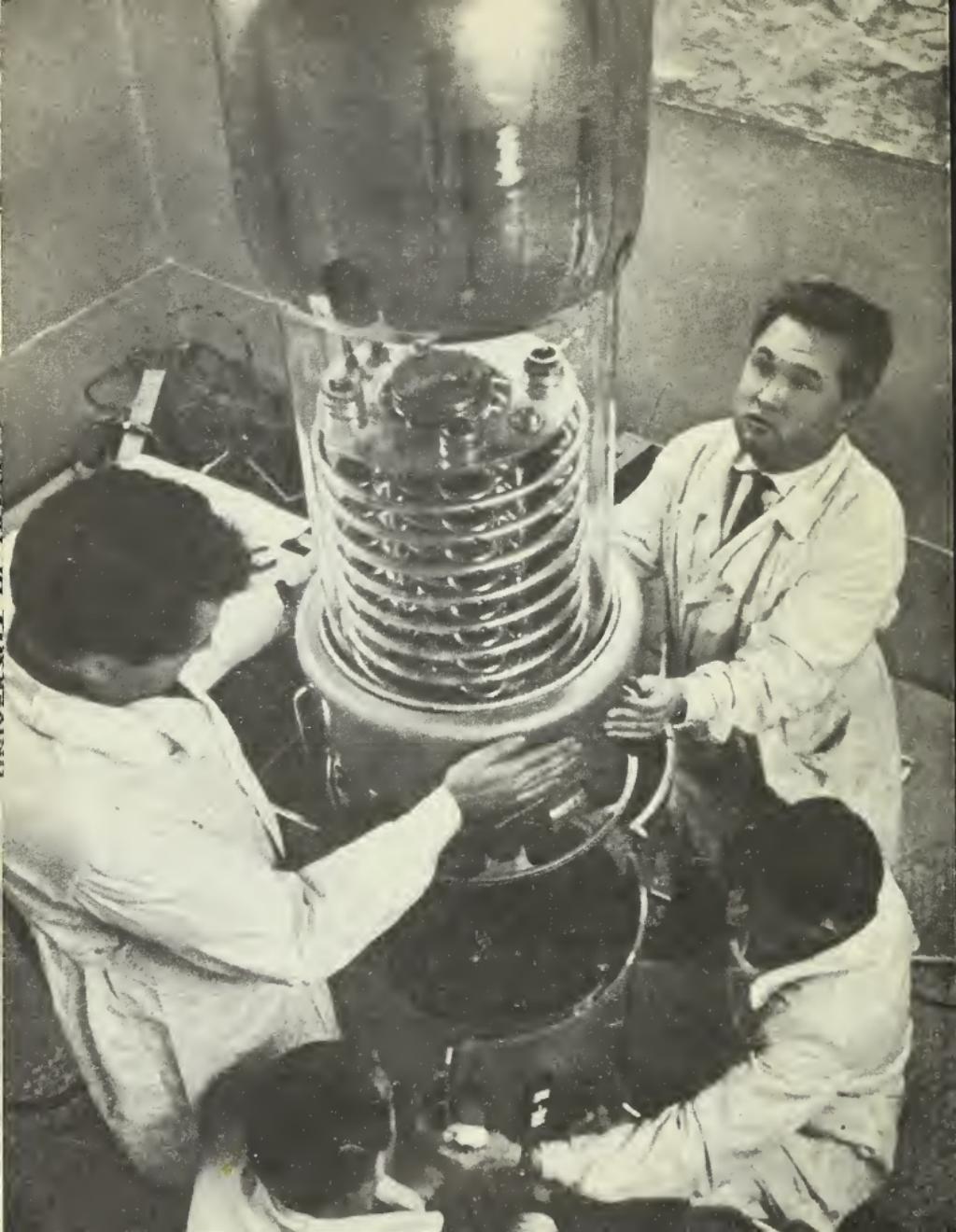
A timber industry complex is a set of plants, not one or two, but dozens merged in "constellations" where huge volumes of timber are processed without wasting a splinter. The products of process-



*Output of wood pulp totalled 3.2 million tons in 1965. By 1970 it is expected to reach 8.4—9 million tons.*



**8.4 - 9**  
MILLION TONS  
  
**1970**



ing include cellulose, cardboard, wood fibre, building panels, fodder yeast, turpentine, tanning materials, and pharmaceuticals.

The development of timber complexes is an interesting phenomenon. It is characteristic for the USSR which is rich in forests. The phenomenon reflects two trends: specialization and cooperation of enterprises. It is distinguished by unprecedented construction scale. Finally, the development of timber complexes is a striking illustration of the opportunities of the chemical industry, and illustration of human ingenuity.

Hence, chemical industry, the youngest of the leading industries, can do practically everything. This omnipotence results from the combined efforts of many thousands of scientists and engineers and helps us to appreciate the role and the importance of science in modern economics.

## **THE DAILY BUILDER**

### **Revolutionaries in White Aprons**

The revolutionaries in the white aprons are scientists. For instance, take Academician Semyonov, a distinguished chemist, the winner of Lenin

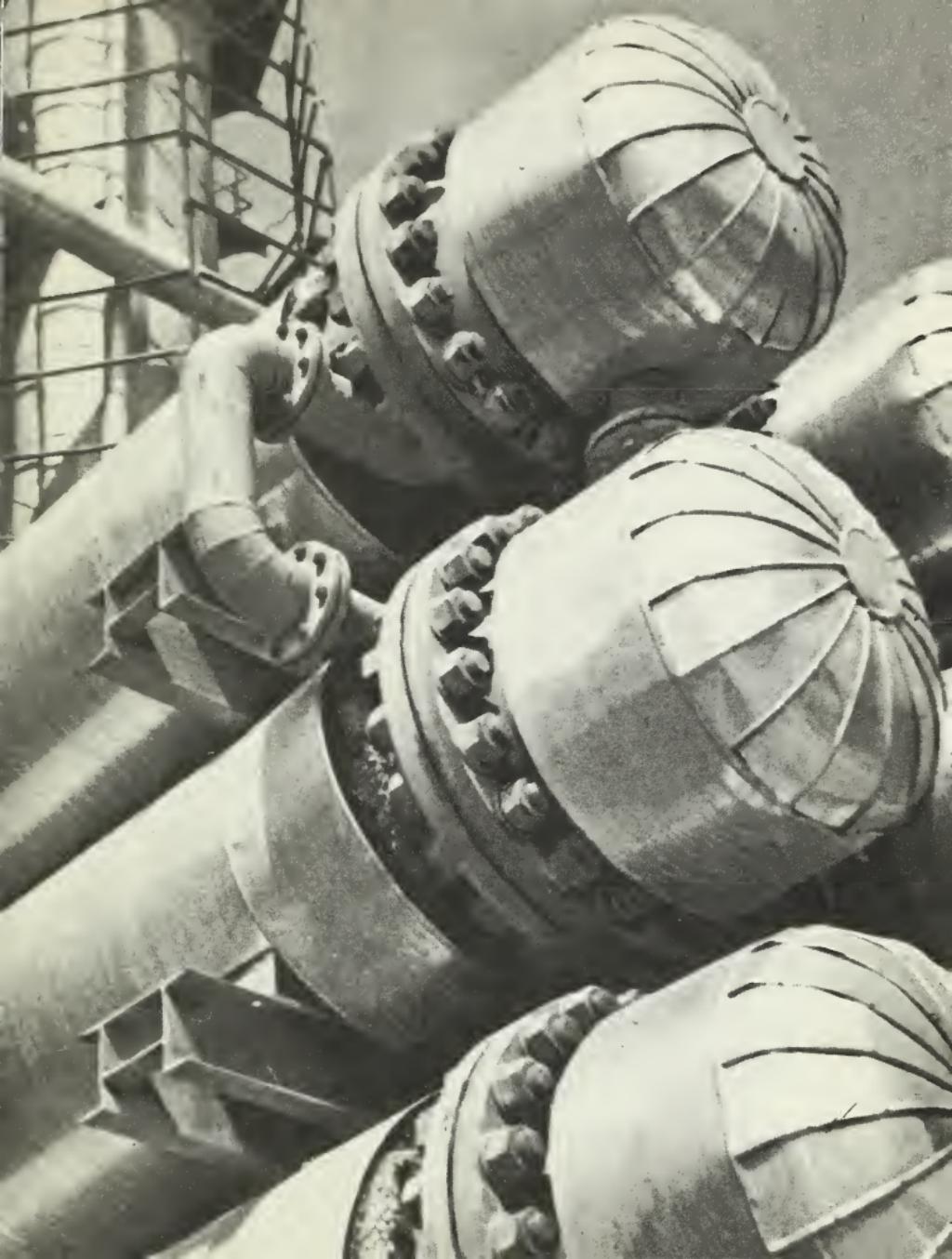
and Nobel Prizes. Basing himself on contemporary progress he has opened the door to the morrow of chemistry, and hence, of the chemical industry.

In the past, scientists were frequently painted as men of seclusion who had divorced themselves from the routine of life for the sake of their improbable truths. Today this portrait is entirely outmoded. Science itself makes its students face the vital necessities of the day.

Discoveries made in most "impracticable" fields of knowledge, more often than not, result in revolutions in technology. Seemingly abstract studies in the physics of the atomic nucleus have led, within a decade, to the development of atomic technology. The electronics of semi-conductors owes its emergence to theoretical studies in the physics of solids.

The appearance and the swift progress of quantum electronics is similarly impressive.

Many remember the first interplanetary contact when signals sent from the Earth bounced back from Venus and brought us the words "Lenin, USSR, Peace." Soviet scientists carried out this experiment using the maser, a molecular generator designed on the principle of paramagnetic resonance discovered by Soviet Academician Zavoisky; secondly, thanks to a special method of putting the quantum system into a radiating state, the



method which was developed by Lenin and Nobel Prize winners Basov and Prokhorov; thirdly, due to the technology of superlow temperatures, developed in Moscow by Academician Kapitsa.

USSR—Venus—USSR! Several years ago this was beyond the human imagination.

The concepts of quantum electronics were first applied to the study of radio waves. Subsequently, at one and the same time, physicists in Moscow and New York paved the way for their application to light waves.

The quantum generator of the optical range — laser — is unexpectedly simple in its appearance. A piece of synthesised ruby or special glass, a flash bulb, differing from the ordinary ones used in photography only by its size, and nothing more.

The brightness of the laser beam is one million times greater than that of the sun. The laser beam can pierce instantly thick steel plates; it is used for accelerating the streams of charged particles and for controlling chemical reactions.

Not long ago people were surprised when the atomic nucleus was put to work. Now the photon — a quantum of light — is also in harness. Even the first applications of quantum amplifiers and generators indicated their promising future.

Let us add that a new star of dazzling brightness has appeared recently over Moscow. This is

the laser beam working for the first time for the Moscow telephone system.

New and often unexpected applications of this miraculous instrument come to the fore every day. We may let our fancy fly because lasers can overtake any fancy.

Fine prospects are opened up in connection with the studies made by Soviet scientists in the physics of plasma. The most important programme in this field is fusion control which will once and for all do away with the threat of power shortage on our planet.

Work has commenced on mastering anti-matter. By bombarding matter in powerful synchrophasotrons Soviet scientists are obtaining more and more anti-particles such as the anti-electron (positron), the anti-proton, the anti-neutron... They have obtained the anti-deuterium — the first complex anti-nucleus. The prefix "anti" does not stand there for nothing. When a particle and anti-particle are fused their annihilation takes place, they are reciprocally destroyed and turn completely into nuclear power quanta. The most daring dreams of physicists are bound to come true. A mere kilogram of "fuel mixture" would be enough to obtain 25 billion kilowatt hours of energy — a tremendous volume which has been achieved according to Einstein's short formula. This is a thousand times more

than the energy derived in the fission of uranium nuclei. With the control of anti-matter the power available to mankind will reach inconceivable volumes. It will make possible flights to remote galaxies, and introduce the stellar age of mankind.

## ***Re-Discoveries of the Americas***

In speaking of a re-discovery of the Americas I am far from belittling the merits of the Vikings and Columbus. The "discovery of America" has become a frequently used phrase when science is increasingly becoming a productive force in the conditions of planned socialist development.

It is often said that we live in days of a new scientific and technological revolution. In many respects this is true. More than 660,000 research associates of 4,650 specialized institutions and departments at higher schools contribute to a chain of ideas and discoveries. The chain is as follows: discovery — new industry — new problems arising in the industry — another discovery settling these problems.

It is hardly necessary to enumerate the "discoveries of America" and their results which are the links in this chain. However, it is worthwhile mentioning the fusion of industrial technology and re-

search. This fusion is the sole way of advancing the material foundation of modern society.

No doubt, some highly promising hypotheses and discoveries are still inapplicable to modern technology. The reasons are varied: at times it is lack of qualified personnel, in other cases it is the slow thinking of industrial staffs, or the difficulties of developing commercial installations, though the laboratory models had worked flawlessly.

And yet given time these problems will be solved. The training of qualified personnel — the guarantee that many problems will be moved — is being solved. The scientist-technologist is already assisting the theoretician and is replacing the factory engineer in new highly automated plants.

## **What the Optimists Think**

There is one achievement of Soviet science which unfailingly exerts a most direct and considerable influence upon the progress of all Soviet industries. It lies in the tremendous industrial progress made in the recent seven-year period. This progress has served as a launching pad for major studies in the field of laws governing socialist management, the elucidation of the new and true role of profit and loss accounting, profit as such, prices and other economic "instruments" active under socialism but altering their nature.

The thorough study of this new role has made possible the launching of a large-scale three-year economic reform. This covers improvement of methods of production planning and management, the turning of enterprises into going concerns, broadening their independence and initiative.

The first group of industrial enterprises in different industries commenced a new type of operations in 1966. Their experience added new proof of the expediency and efficiency of the planned reform. Unbiased observers, including the majority of serious-minded observers in the West, have noted that the re-organization supplements the argumentation, realism and inner harmony of the Five-Year Plan.

„The Five-Year Plan is unquestionably completely feasible," is the view of all those who have been following objectively the development of the Soviet Union. A few words may be added to this.

The 23rd Congress of the Communist Party of the Soviet Union made a business-like study of the shortcomings of the former practice in planning and management. These shortcomings appeared in those periods when the real role of the objective laws of the economy and a sober-minded analysis of possibilities were glossed over and replaced by unrealistic wishful thinking.

Thanks to the timely and detailed analysis of

past mistakes the current Five-Year Plan is distinguished by its practical nature and businesslike approach. Today, more than ever before, possibilities are seen not only for the exact attainment of targets but also largely for exceeding them.

A well-defined forecast always gives food for thought. Such factors as the economic potential, the wealth of the nation, the overall production increment in the Five-Year Plan, the increase of the Soviet national income by 38—41 per cent over the same period, all show the great strength of the Soviet economy.

And yet the mind prefers concrete food. Quite possibly this explains the tremendous ovation given by the world, when, shortly before the start of the Seven-Year Plan, in 1957, there appeared a new specific indicator of the cumulative possibilities of Soviet industry and science, an indicator which relegated all other topics to the background. It flew, giving its "bleep-bleep" signal, over the planet.

Today we have witnessed the completion of an important stage in the conquest of extra-terrestrial space. It commenced by the launching of the Earth's first satellite. It was followed by the emergence of man into outer space, the photographing of the rear side of the Moon, group flights, space walks, and finally the soft landing of an automatic probe on the Moon and the first tele-





vision reportage from the surface of our natural sputnik. The bull's-eye hit by a Soviet rocket on Venus was greeted as a major event. At long last the Moon has acquired a sputnik of its own that hails from the USSR. Thus from the first sputnik of the Earth to the sputnik of the Moon is the stage covered by world space science and technology, with the Soviet Union in the lead.

Now, Soviet people are engaged on new tasks of peaceful exploration of outer space and are working on new plans of peaceful construction on earth.

This completes the story of Soviet industry. It is much too brief to mention all aspects and all stages in its development, its dynamic nature, its strength, diversity and purposefulness.

But the picture is enough to let all men know—

The achievements of the Soviet people, of Soviet science, and of Soviet technology are outstanding.

2,078 million roubles' worth of instruments and automatic devices was produced in 1965. The number of listed products will be increased and their quality improved during the five-year period. In monetary evaluation their annual production will reach 3,570—3,670 million roubles by 1970. In 1958, the year before the Seven-Year Plan was launched, the Soviet Union produced 4.6 million tons of steel pipes.



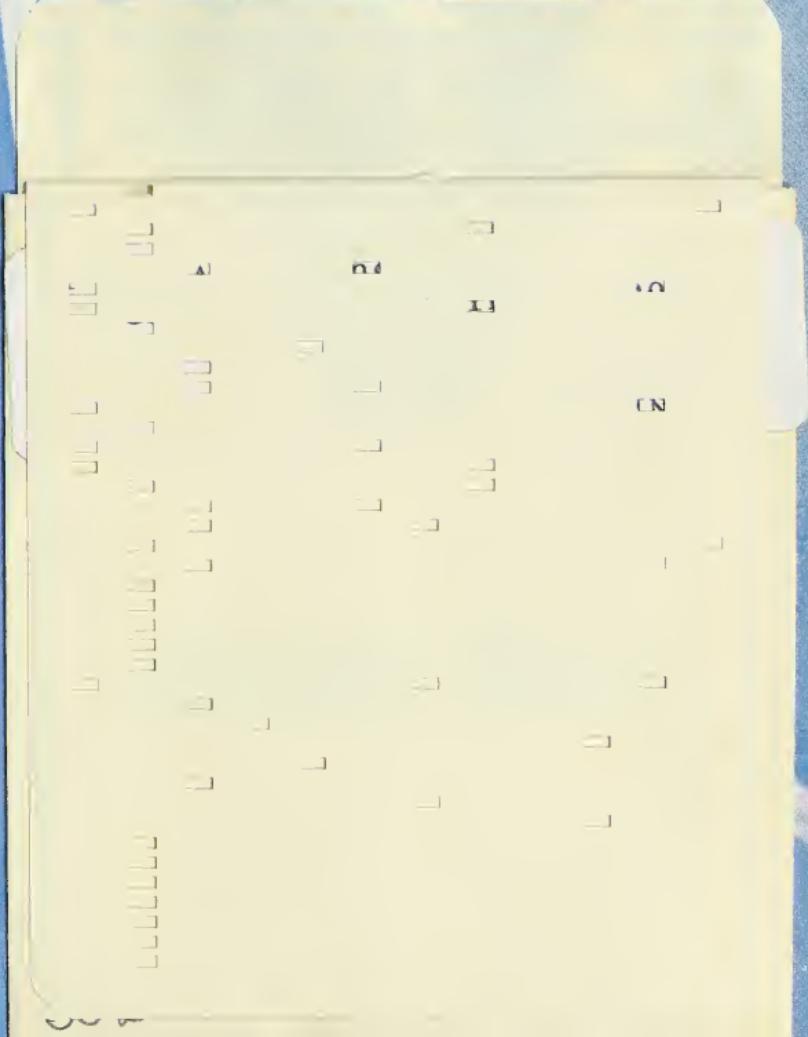
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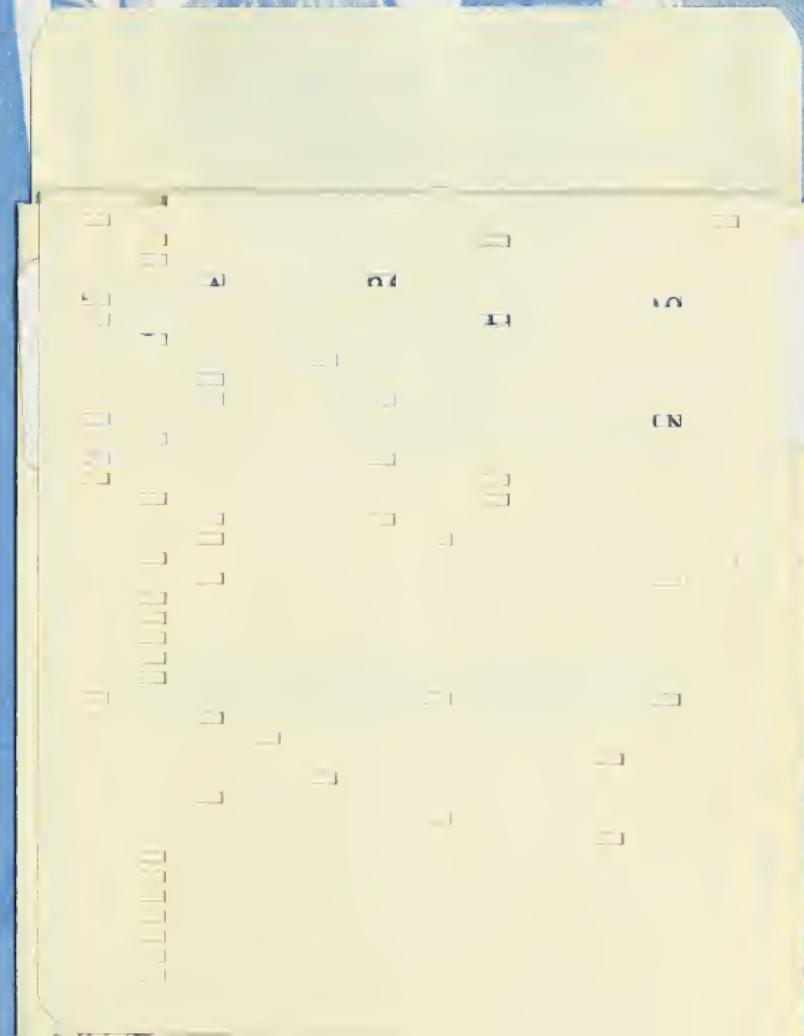
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By 196~~6~~<sup>1970</sup> ... the current five-year period the assortment of steel pipes will be extended and their annual production increased by another 5—6 million tons.

During the five-year period (1966—1970) labour productivity in industry will rise by 33—35 per cent.

„ИНДУСТРИЯ“  
на английском языке



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